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LEAVES FROM THE NOTE-BOOK OF A BELLEVUE NURSE

LECTURE I.—DISEASE

(Continued from page 252)

DISSEMINATION OF BACTERIA.

SOME bacteria possess the quality of ameboid movements, and by this process can get from place to place. Then, likewise, some of them possess little, arm-like processes known as flagellæ, by which they draw themselves about. Before speaking of the other way in or by which bacteria can get from place to place, I will speak of how they enter the body. They may enter by the gastro-intestinal tract, respiratory tract, genito-urinary tract, and by the skin. They cannot, however, enter the body by way of the skin as long as that is thoroughly intact, but if there is an abrasion, they enter and grow, producing disease by inoculation, as it is termed. Many diseases are contracted in this manner, as erysipelas, syphilis, tuberculosis, septicæmia, etc. It has been demonstrated by experiment that streptococci and staphylococci constantly infest the cutis, and even bury themselves deep down around the small sweat-glands, hair-follicles, and papillæ, lying there in wait for some break in the skin to enter and produce erysipelas, cellulitis, or abscess.

From this it can be seen how hard it is to make the hands thoroughly aseptic. A disease is said to be endemic when it is peculiar to a certain locality,—that is, it exists there without being brought,—as, for example, yellow-fever in Cuba and malaria in certain Southern localities.

A disease is said to be epidemic when it occurs in certain localities, sometimes spreading to others. Disease may be disseminated through the air, through water and other fluids, by means of the clothing, merchandise, letters, small animals—mice, rats, cats, and dogs.

It is not absolutely necessary that these animals should be suffering from the disease in order to be mediums by which it may be disseminated, as they may carry it in their hair or wool, and rats and mice may carry contaminated bread-crumbs, etc. It has been proven that pet cats have been the means of disseminating diphtheria from one child to another, and pet dogs have developed tuberculosis and given it to different members of the same and different families. In order that this may be impressed upon you, I will take up a few of the most important contagious and infectious diseases and point out their special ways of being disseminated. Tuberculosis (the germ of which was discovered by Koch in 1881) is caused by a small, rod-shaped bacteria, or bacillus. This is the case not only with tuberculosis of the lungs, known as consumption, but with all other forms of tuberculosis, as scrofula, which is a tuberculosis of the lymphatic glands. These bacilli usually enter the system by being inhaled with the dust that is floating about in the air, and that contains these germs in large quantities where careless cases of consumption have previously been. The bacillus gets into the dust through the carelessness of the patient, or it may be ignorance, in expectorating on the floors, and this sputum dries and flies about when stirred by the sweeping-broom, etc. This dust is inhaled by other people, and if their vitality is depressed for any reason, they immediately develop tuberculosis, for in this depressed condition it forms a favorable soil for the growth and multiplication of the bacillus. It has been proven by post-mortem examination that a large number of people who die from other causes have at some time during their life had tubercular processes in their lungs, and have healed them up and gotten well. These old processes in the lungs leave small scars, which are composed of connective-tissue surrounding the tubercular focus and shutting it off from the general system, and thereby rendering it inactive and inert. That the air is filled with these bacilli in an infected place has been proven by Dr. Nuttal, of Johns Hopkins University, who found that one patient whom he examined threw out from a quarter of a million to two million bacilli in twenty-four hours. Miquel found that the atmosphere of large cities contained two thousand bacteria of different kinds to the square inch, and that in a much used hospital there were ninety thousand to the square yard. The tubercular bacillus is perfectly harmless if kept in a moistened state, only doing damage when allowed to dry and be pulverized and fly about in the dust. That tuberculous patients can be made entirely harmless to those living with them has been proven by Hance, who found upon examination of the dust taken from the walls and floors of sixteen buildings of Trendion's sanatorium for consumptives that the dust of only one room contained the bacillus, and this was occupied by a very careless patient. Patients here are made to use special sputa cups, of ordinary earthen-ware, that are kept partially filled with carbolic water and washed frequently, and by this means the patient is kept free from bacilli and from reinfection, and other well people escape getting sick. Some time ago I endeavored to find out what percentage of people who were suffering from tuberculosis without having a family tendency to it caught it from others. I collected two thousand and fifty-seven cases, and three hundred and thirty of that number gave a history of having an inherited tendency, the remaining seventeen hundred and twenty-seven affirming that there never was tuberculosis in their families. It can, therefore, be seen that about seventy-five per cent. developed tuberculosis who had no hereditary weakness and who might have been saved, or at least some of them, if the previous sick had had the proper instruction. These patients were taken from among the poor and ignorant of the city, and on this account some allowance must be made as to falsifying their histories, but I believe it can be truthfully said that one to two thousand people develop tuberculosis in the city each year by becoming infected through the carelessness, or perhaps ignorance, of those who are sick with it. The next most common manner in which tuberculosis is disseminated is through milk and water that is taken into the stomach, especially of infants. Cows are very susceptible to tuberculosis, and when a milch cow develops it the bacilli may, and often do, appear in the milk. The tubercles may likewise be deposited in the flesh of the animals, and this, eaten by people who are weak, may develop in them tuberculosis. All meat should, therefore, be well cooked and all milk sterilized before it is used. Tuberculosis may also be developed by inoculation under the skin. Knowing, then, the specific cause of tuberculosis, one of our most common and fatal diseases, and the manner in which the bacillus is disseminated and the way in which it enters the body, it should be a comparatively easy task for one to be of great benefit to the human race in limiting this most terrible of diseases, and I will go further, and say that it seems to me almost criminal for one not to know these things in this time and age of progress. Take, also, typhoid fever, and we see that it is caused by the entrance into the body and multiplication of a bacillus discovered some years ago by Eberth, which is known as the bacillus of Eberth. The bacilli find a favorable soil in the mucous membrane of the small intestines, Peyer's patches, and solitary follicles. Here they begin to grow and multiply, and are absorbed into the blood of the patient.

In a patient suffering from typhoid fever these bacilli are present in all the discharges from the body, especially in the feces, urine, and vomited matter. These germs, if not destroyed, will certainly be scattered about and infect other people. Wells and often small streams are contaminated by these discharges, and the disease may become epidemic and even spread to people at a great distance from the site of the original infection. At a New Jersey farm-house a few summers ago there was a case of typhoid fever, and the discharges were thrown into a small creek running past the house, and this creek in its course, some distance away, ran near a milk dairy, and the water from it was used in washing the milk-cans; then the milk was put into these cans and brought to New York City and sold,—fortunately, to a limited district. In this district typhoid became almost epidemic, and upon investigation, the disease was found almost exclusively in people who used this milk.

Typhoid is, therefore, usually communicated by milk or water that is taken into the stomach. Then those who attend these cases may develop it by carelessly allowing the bacilli to get under their nails, and then taking them into the stomach at the dinner-table. Rarely typhoid may be developed by inhaling the germ into the lungs, and likewise by eating vegetables from an infected neighborhood. Diphtheria is gotten almost exclusively by getting the Löffler's bacillus in contact with an injured membrane (mucous) of the nose and throat usually. This disease is largely one of childhood, because the little ones spend most of their time on the floor and there get the germs. It is usually spread from house to house by means of clothing, etc. Milk, water, and food may become contaminated and spread the disease. The bacilli infect principally the discharges from the nose and throat, likewise the vomited matter, feces, and urine contain them.

Therefore diseases of an infectious or contagious nature should always be isolated, all extra hangings taken from the room, rugs used instead of carpets, and when the patient recovers all clothing, rugs, etc., should be disinfected or destroyed. All discharges should be disinfected before they are thrown out, and the sinks and closets in the house thoroughly once or twice a day. Before going into the subject of disinfection proper I should like to say a few words as to how nature combats the numerous and troublesome little germs, for, no doubt, it has occurred to you as strange that some people are never sick, while others are often sick, some of these very sick, while others with the same diseases are but slightly affected.

PROPHYLAXIS.

That many diseases can be prevented entirely has been proven in numerous instances; for example, yellow-fever, which in 1878 existed in epidemic form in Memphis, Tenn., and also many times before that, was completely abolished, never occurring there since, by the city being properly drained and sewered by the late George T. Waring. Likewise leprosy existed to a great extent in England, but by proper care and isolation of cases it has been blotted out there entirely. In the prevention of disease there are two forces that can be utilized, viz.:

(1) Natural force.

(2) Artificial—(*a*) disinfection, (*b*) isolation, (*c*) antisepsis.

The first, the natural force, consists of the natural cell resistance or vitality that exists in a person. This resistance to disease may be strong from birth or it may develop strongly as the individual grows up. It may, on the other hand, be weak from birth or develop a weakness after birth. Through the vicissitudes of ordinary life this vitality can be greatly depressed, thus placing the person at the mercy of disease, or it may be strengthened by artificial means, thus making the person more able to resist diseases.

Take, for example, the white rat, which ordinarily is immune to the anthrax bacillus, a very contagious disease to certain animals, and make it turn a revolving wheel in a cage until it is nearly exhausted; it will then be quickly and easily affected by anthrax. This shows that the exhaustion depresses its natural resistance and cell vitality, making it susceptible to the disease artificially. Bacteria, like all living growing things, require certain favorable conditions to be present before they can grow and multiply, and, like in all other living things, there is a change that takes place in them as a result of this growth and multiplication. This change may be compared to the change that takes place in the human body as a result of metabolism. In the process of metabolism we have a waste substance formed which, if not thrown off and out of the body, acts as a poison to the system and produces disease, as Bright's disease.

Now the substance that is formed by the growth of the bacterium is known as toxin, and when absorbed into the blood it causes the symptoms of disease. This has been proven to be just what occurs in diphtheria when the Löffler's bacillus lodges in the throat and then begins to grow, forming a false membrane, which extends into the tissues containing the germs, which continue to grow, and as a result of this growth toxins are formed and absorbed by the blood and lymphatics.

The bacillus itself only acts locally, not getting into the blood, the absorption of the toxin causing all of the symptoms.

(To be continued)

FADS: THEIR VALUE TO NURSES

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Perhaps the trivial and whimsical nature of fads may prejudice the serious-minded among us against encouraging them, but a fairly well-regulated fad is such a delightful means of recreation and amusement, that to be without one deprives a person of valuable resources.

A fad, shorn of its more irrational attributes, is capable of becoming a pleasant avocation, filling hours of leisure with delight, beguiling hours of weariness, and preventing restlessness. Therefore let us have fads.

Whether a nurse is spending twenty-odd hours a day with the good old lady who thinks she would like her shawl around her, and straightway finds that too warm and calls for her nightingale, then soon begins to shiver and call for the shawl again, or is watching a patient whose